

What is claimed is:

1. An integrated circuit package comprising:

a carrier having a top surface, a side and one or more routing strips being integral with said carrier;

5 one or more terminals disposed on a side of said carrier, at least one of said terminals being electrically connected with at least one of said routing strips;

10 a chip adhered to said carrier, said chip having one or more bonding pads, wherein said one or more bonding pads are electrically connected to at least one of said routing strips; and

potting material covering at least a portion of said routing strips, wire bonding and bonding pads.

15 2. The integrated circuit package as recited in claim 1 wherein said carrier includes at least one bus bar being integral with said carrier, said at least one bus bar electrically connected to at least one of said terminals on said side surface of said carrier.

3. The integrated circuit package as recited in claim 1 further comprising at least one solder ball disposed on at least one of said terminals disposed on said side surface of said carrier.

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4. The integrated circuit package as recited in claim 1 wherein said potting material encapsulates said chip and wherein said potting material has a thickness of about 6 mils.

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5. The integrated circuit package as recited in claim 1 wherein said carrier has a thickness of at least about 30 mils.

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6. The integrated circuit package as recited in claim 1 wherein the overall profile of said package is between about 40 mils and 50 mils.

7. The integrated circuit package as recited in claim 1 wherein the profile of said package is about 41 mils.

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8. The integrated circuit package as recited in claim
1 wherein the profile of said package is about 44 mils.

9. The integrated circuit package as recited in claim
1 wherein the profile of said package is about 47 mils.

10. The integrated circuit package as recited in claim
1 wherein the profile of said package is about 50 mils.

11. A high density vertical module comprising:

a horizontal circuit board; and

at least one integrated circuit package having a vertical surface and a side perpendicular to said surface, and having terminals on said side surface that are electrically connected to said circuit board.

12. The high density vertical module as recited in claim 11 further comprising a plurality of tabs being integral with a top surface of said circuit board.

13. The high density vertical module as recited in claim 11 wherein said module further comprises one or more integrated circuit packages electrically connected to said circuit board to the side surface terminals of said integrated circuit packages.

14. The high density vertical module as recited in claim 13 wherein said integrated circuit packages comprise:

a carrier having an opening and a side surface, and at least three routing strips being integral with said carrier and extending into said opening;

at least three terminals disposed on said side surface,
5 said at least three terminals disposed on said side surface being electrically connected with at least three of said routing strips;

a chip adhered to said carrier, said chip having at least three bonding pads;

10 wire bonding electrically connecting said at least three bonding pads to said at least three routing strips; and

potting material filling said opening.

15 15. The high density vertical module as recited in claim 14 wherein said integrated circuit packages further include at least one bus bar being integral with said carrier and extending into said opening, said bus bar electrically connected to said bonding pads and said terminals disposed on said side surface of said carrier.

16. The high density vertical module as recited in claim
11 further comprising solder balls disposed between said
integrated circuit package and said circuit board.

5 17. The high density vertical module as recited in claim
11 further comprising solder columns disposed between said
integrated circuit package and said circuit board.

TOP SECRET

18. A high density double-sided vertical module comprising:

a circuit board having a top tab and a bottom tab;

a first integrated circuit package having a side surface terminal, said side surface terminal of said first integrated circuit package being electrically connected to said top tab of said circuit board; and

a second integrated circuit package having a second side surface terminal, said second integrated circuit package being electrically connected to said bottom tab of said circuit board through said second side surface terminal.

19. The high density double-sided module as recited in claim 18 further comprising at least three tabs being integral with said circuit board.

20. The high density double-sided module as recited in claim 18 further comprising solder balls disposed between said terminals of said integrated circuit packages and said tabs of said circuit board.

21, 22. A process of providing a high density module produced by a process comprising the steps of:

obtaining a circuit board having a top; and

electrically connecting at least one integrated circuit package having a side surface terminal, said first integrated circuit package being electrically connected to said top of said circuit board through said side surface terminal of said integrated circuit package.

22, 23. The process as recited in claim 21 further including the step of electrically and perpendicularly connecting at least two integrated circuit packages to said circuit board.

23 24. The process as recited in claim 21 further including the step of disposing solder ball between said side surface terminal of said integrated circuit package and said top of said circuit board.

2425. The process as recited in claim ²¹22 further including the step of disposing solder columns between said integrated circuit and said top of said circuit board.

5 25 26. The process as recited in claim ²¹22 further including the step of integrally attaching at least three tabs to said circuit board.

10 26 27. The process as recited in claim ²¹22 wherein said integrated circuit package is further defined as being connected in a substantially perpendicular manner to said circuit board.

15 27 28. The process as recited in claim ²¹22 wherein said integrated circuit package is further defined as being connected at an angle between 30 and 90 degrees to said circuit board.